4222

BOARD DIPLOMA EXAMINATION, (C-14)

MARCH / APRIL - 2019

DCE - III SEMESTER EXAMINATION

HYDRAULICS

Time : **3** Hours] [Total Marks : **80**

PART - A 3×10=30

Instructions : (1) Answer **ALL** questions.

(2) Each question carries **THREE** marks.

(3) Answer should be brief and straight to the point and shall not exceed five simple sentences.

1 Define the terms :

(a) Mass density 1

(b) Specific weight 1

(c) Specific gravity 1

2 Define total pressure and centre of pressure. $1\frac{1}{2}+1\frac{1}{2}$

3 Define :

(a) Uniform flow 1

(b) Non uniform flow 1

(c) Steady flow 1

4 A convergent mouthpiece is discharging water under a constant head of 9 meters. Find the discharge, if diameter of the mouthpiece is 6 cm. **3**

4222] 1 **[Contd...**

5 What is a notch? Classify the notches based on the shape   **1+2**
of opening?

6 Find the discharge over a triangular notch of angle 60,   **3**
when the head over the V-notch is 0.3m. Assume cd = 0.6.

7 State the formula for head lost due to   **3**

   (a)   Sudden expansion of pipe

   (b)   Sudden contraction of pipe.

8 State the formula for Manning's and Chezy's and name $1\frac{1}{2}+1\frac{1}{2}$

the terms.

9 What is an axial flow turbine? Give an example.   **2+1**

10 Write any three functions of surge tank.   **3**

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PART - B   **10×5=50**

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Instructions :   *(1) Answer any **FIVE** questions.*

               *(2) Each question carries **TEN** marks.*

               *(3) Answer should be comprehensive and the criterion
for valuation is the content but not the length of
the answer.*

11 An annular plate 4m external diameter, and 2m internal   **10**
diameter, is immersed in an oil of specific gravity 0.8, with its
greatest and least depths below the oil surface of 4m and 2m
respectively. Determine the total pressure and depth of centre of
pressure on one face of the plate.

12 A vertical tapering pipe has top dia. 0.8 m and bottom dia.   **10**
1.0 m. The water is flowing down in full. The pipe is 8m long.
The frictional loss between top and bottom points may be taken
as 0.15 × velocity head at inlet. The velocity at inlet is 8 m/s.
Determine the pressure at top in N/mm^2 when the Pressure head
at the bottom is 9.8 m of water.

13 Water flows through a sharp edge circular orifice 7.5 mm dia.   **10**
in the side of a tank. The head of water above the centre of the
orifice is 1.22 m. The jet passes through a ring whose centre is
1.22 m horizontally and 330 mm vertically from the Centre of the
vena contracta. The time required to discharge 66 lit of water
was 500 sec. Find The hydraulic coefficients c_c, c_v, c_d.

14 Water flows over a rectangular notch of 1.5 m length over a   **10**
depth of 20 cm. Then the same quantity of water passes through
a triangular right angled notch. Find the depth of water through
the notch. Take the coefficient of discharge, for the rectangle and
triangular notch, as 0.62 and 0.60 respectively.

15 Two reservoirs are connected by a pipe line 26 m long   **10**
consisting of two pipes, one of 20 cm dia. and length 8 m and
the other of dia. 24.0 cm and 18 m length. If the difference of
water level in two reservoirs is 10 m, calculate the discharge
considering losses. Take 4f = 0.04.

16 (a) A 4 km long water main has to carry a discharge of   **5**
0.65 cu.m. If the maximum allowable loss of Head due to
friction is 35 m, find the maximum diameter required using
Darcy's equation.
Assume f = 0.008. Neglect minor losses.

(b) A rectangle channel is of 10 m wide and 4 m deep.   **5**
Find the bed slope to be maintained to carry a discharge of
75 m^3/sec. Take chezy's constant as 60.

17 A trapezoidal channel has a side slope 3 vertical to 4 horizontal. **10**
The discharge in the channel is $35m^3$/sec. Under a bed slope
of 1 in 2500, design the most economical section in the channel.
Use Manning's formula N = 0.01.

18 Differentiate between impulse and reaction turbines. **10**

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